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WATER RESOURCES DIVISION

CENTRAL PLANNING GROUP

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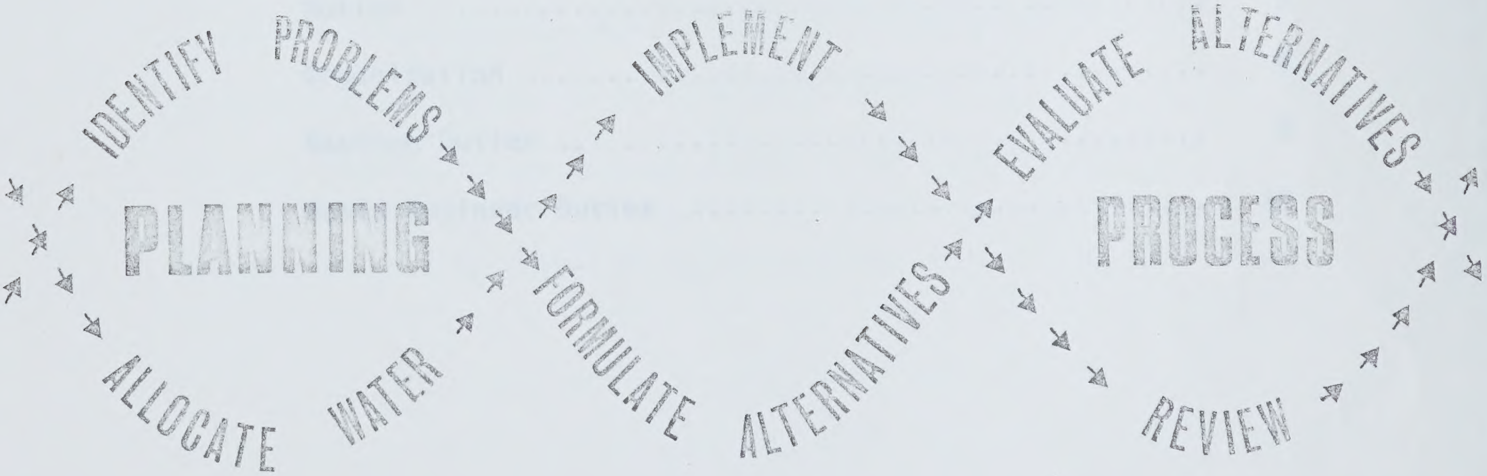

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CENTRAL PLANNING GROUP

INTRODUCTION

As the awareness of the complexity of water resource developments increases, the need for effective water resource planning becomes evident. The Central Planning Group, for its purpose, has defined planning as:

"The dynamic determination of courses of action prior to implementation."

Implementation is defined as:

"To carry out the approved course of action."

This definition of planning recognizes that the planning function is an on-going process, requiring permanence and continuity. The planning function must be closely integrated with the implementation function, as part of the overall planning process.

Reason for Planning

Because water is an essential part of the environment and a factor which to a large degree determines the quality of life, water resource planning must take into account both the utilization and environmental aspects of water management. It must be recognized that water cannot be exploited as a non-renewable resource, such as coal, but must be utilized in a way which will ensure adequate quantity and quality for all subsequent uses. Thus planning cannot attempt to merely increase the utilization benefits, but must also aim at providing the environment desired by society. The planning process provides a mechanism through which conflicting demands can be reconciled, benefits can be increased and adverse affects minimized. The planning function relates to the Division's goal by:

1. measuring water demands or identifying problems as indicated by society.

2. recommending optimum management and development systems to meet these demands.

History of Planning

Water resource planning in the Division has progressed through several stages. Chronologically, these include:

1. Water Resources Branch prior to 1965. The Branch used a functional approach to planning, dealing largely with single-purpose projects.
2. Conservation and Development Branch, 1966-67. Multi-purpose projects received greater emphasis.
3. Development Planning Branch, 1967-70. This Branch initiated comprehensive river basin planning, which concentrates on multi-purpose projects, and introduced network diagramming in water resource planning.
4. Central Planning Group, 1971. Greater emphasis has been placed on planning as a dynamic process in which the continuous collection of information for the purpose of resolving uncertainties and discerning future trends is an essential part. The planning function has been analyzed and categorized for a better understanding of the role of the Group.

The development of planning in Alberta is somewhat parallel to the evolution of the planning process in the U.S.A., which can be summarized thus:

1. Prior to 1940, water resource planning was generally confined to functional single-purpose projects.
2. By the late 1940's - early 1950's comprehensive river basin

planning was started.

3. By 1961, the U.S. Federal Government was developing a nationwide, comprehensive plan for all major river basins. Planning is now proceeding at four levels:

    Step I - framework plans to delineate areas that need more detailed studies.

    Step II - individual river basin studies.

    Step III - project or single-purpose studies.

    Step IV - co-operative state studies.

The Alberta Water Resources Division has implemented River Basin studies, discussed below, analogous to the first two steps of this comprehensive plan.

BASIS FOR PLANNING WATER RESOURCE DEVELOPMENT

Alternative Approaches

Any planning process usually centers on the resource concerned. To facilitate comprehensive planning, the resource can be organized into basic units or areas. Such units can be defined by several means; for example, for water resource planning the Province of Alberta can be divided into:

1. Economic regions.
2. Administrative regions.
3. Major water-using regions.
4. River basins.

The first three units, which are social entities, possess the advantage of having data readily available in terms of their own geographic area. However, these types of organizational planning units

have no relationship to the availability of the resource - water. The fourth unit, the river basin, forms a natural planning unit for water resource planning for several reasons:

1. The river basin is a distinct hydrologic entity and a readily definable physical unit.
2. The river system is the key resource which the planning process must examine and understand.
3. Management of the resource is more easily achieved with a basin approach.
4. The river basin planning unit is particularly useful if more than one government is involved in water resource development. (Examples: the Prairie Provinces Water Board, and the inter-government river basin compacts which have been legislated in the U.S.A.).

River Basin Planning in Alberta

The river basin planning approach has been adopted in Alberta; five major river basin study areas have been established:

1. South Saskatchewan River Basin Study Area.
2. Red Deer River Basin Study Area.
3. North Saskatchewan River Basin Study Area.
4. Athabasca River Basin Study Area.
5. Peace River Basin Study Area.

The study areas approximate these river basins, but also include smaller basins such as the Missouri, Churchill, MacKenzie and several small closed basins. Study area boundaries have been defined along administrative borders to facilitate data collections. Plate No. 1 illustrates the principal river basins in Alberta, while Plate No. 2 shows the five river basin study areas.

The river basin planning approach developed for several reasons:

1. Requests for local and regional water development projects are being received constantly. Plate No. 3 shows requests or complaints on file by study area. An integrated approach to solving these problems is preferable to a piecemeal approach.
2. Water resource problems are complex in nature, requiring a multi-disciplinary approach to arrive at a satisfactory solution.
3. Efforts by various Water Resources Branches and other agencies dealing with the water resource can be integrated and co-ordinated more readily.

Basin Studies Underway

South Saskatchewan River Basin Study   The first attempt at comprehensive river basin planning has been the South Saskatchewan River Basin Study. This study, which involves several agencies, was launched in response to growing concern over water availability in the South Saskatchewan Basin in 1966. An economic input-output model will be developed for forecasting future water requirements. Plate No. 4 illustrates typical activities and agencies involved. Plate No. 5 shows the Study Area and potential projects, and Plate No. 6 indicates the progress to date.

Red Deer River Basin Study   The Red Deer River Basin Study has been initiated, but has not received the priority assigned to the South Saskatchewan River Basin Study. Problems in the Study Area include variable water supplies in East-Central Alberta and low flow conditions in the Red Deer River. Plate No. 7 shows the progress of the study to date.

Sub-Basin Studies Underway

Sturgeon River Basin Study   This study, initiated in 1968, was

undertaken in response to complaints of flooding in the Pembina and Sturgeon Rivers, requests for lake stabilization in the Sturgeon River system, and low flow problems. Plate No. 8 shows progress on the study.

Battle River Basin Study Some data collection has been started, but additional organization is required. Work to date has concentrated on specific studies related to potential projects in the basin. These projects have been proposed to alleviate low flow problems in the Battle River. Plate No. 9 shows the progress to date on the study.

Planning Techniques

The planning procedure which has been adopted can be summarized as follows.

1. Identification of the problems relating to the water resource.
2. Formulation of alternative solutions to the identified problem.
3. Evaluation of the alternatives for social and economic feasibility.
4. Selection of the most acceptable alternative, based on governmental approval.
5. Implementation of the approved solution.
6. Review of the implemented solution.

Because of the complexity of the planning process, which involves both multi-agency studies and multiple-use projects, systems analysis techniques will be applied to the river basin studies. Network diagramming, a first phase of systems analysis is already being utilized, and is useful for several reasons:

1. Each activity in the planning process can be identified, along with its relationship to all other activities.
2. Each activity can be assigned to a specialist agency for completion.
3. Study durations and costs can be more easily calculated.

4. Activities can be scheduled, resulting in more efficient use of resources such as manpower, equipment and funds.

ORGANIZATION OF THE CENTRAL PLANNING GROUP

The Central Planning Group operates within the framework of the Office of the Director and is responsible to the Chief Engineer. The Group functions as a Secretariat to the Planning Advisory Board. The objective of the Central Planning Group is to co-ordinate the activities of the Water Resources Division and external agencies in order to obtain optimum management and development of the Province's water resources, and thus realize the Division's goal.

Duties:

Under the direction of the Planning Co-ordinator, it is the duty of the Central Planning Group to:

1. Identify problems and demand areas together with suggested approaches and priorities.
2. Formulate water resource systems.
3. Search for alternatives in water management.
4. Evaluate solutions.
5. Co-ordinate and schedule inter-branch, inter-departmental or inter-agency activities within the terms of reference of specified programs and projects.
6. Formulate and recommend changes required in existing Division programs and the initiation of new Division programs, designed to meet the changing needs of society, both present and future.
7. Determine implications of policies and programs of other agencies on the Water Resources Division.

8. Set development standards.

Organization

In order to perform the above duties, the Central Planning Group comprises four Specialist sections plus Basin Engineers along with their supporting staff. At present, only the South Saskatchewan and North Saskatchewan Basin Engineer positions are filled. The present organization chart is shown on Plate No. 10.

A more ideal organization of the Central Planning Group, which would enable it to perform more efficiently, is illustrated on Plate No. 11. It is hoped that all Basin Engineer positions and additional supporting staff positions will be filled as shown. The Basin Engineer and Regional Administrator positions will be amalgamated to eliminate the overlap which presently exists.

Section Duties

1. Demand and Evaluation Section
   - Collection, compilation and analysis of water demand data.
   - Evaluation of effectiveness of existing programs and projects, in meeting water and related demands and program objectives.
   - Measurement of benefits of proposed projects.
   - Provision of cost-benefit analyses and ecological studies from other agencies.
   - Establishment of acceptable methodologies for demand and evaluation techniques for water resource projects.
2. Project Formulation Section
   - Formulation, on the basis of identified demands, of inter-basin water resource systems to meet provincial needs and

commitments.

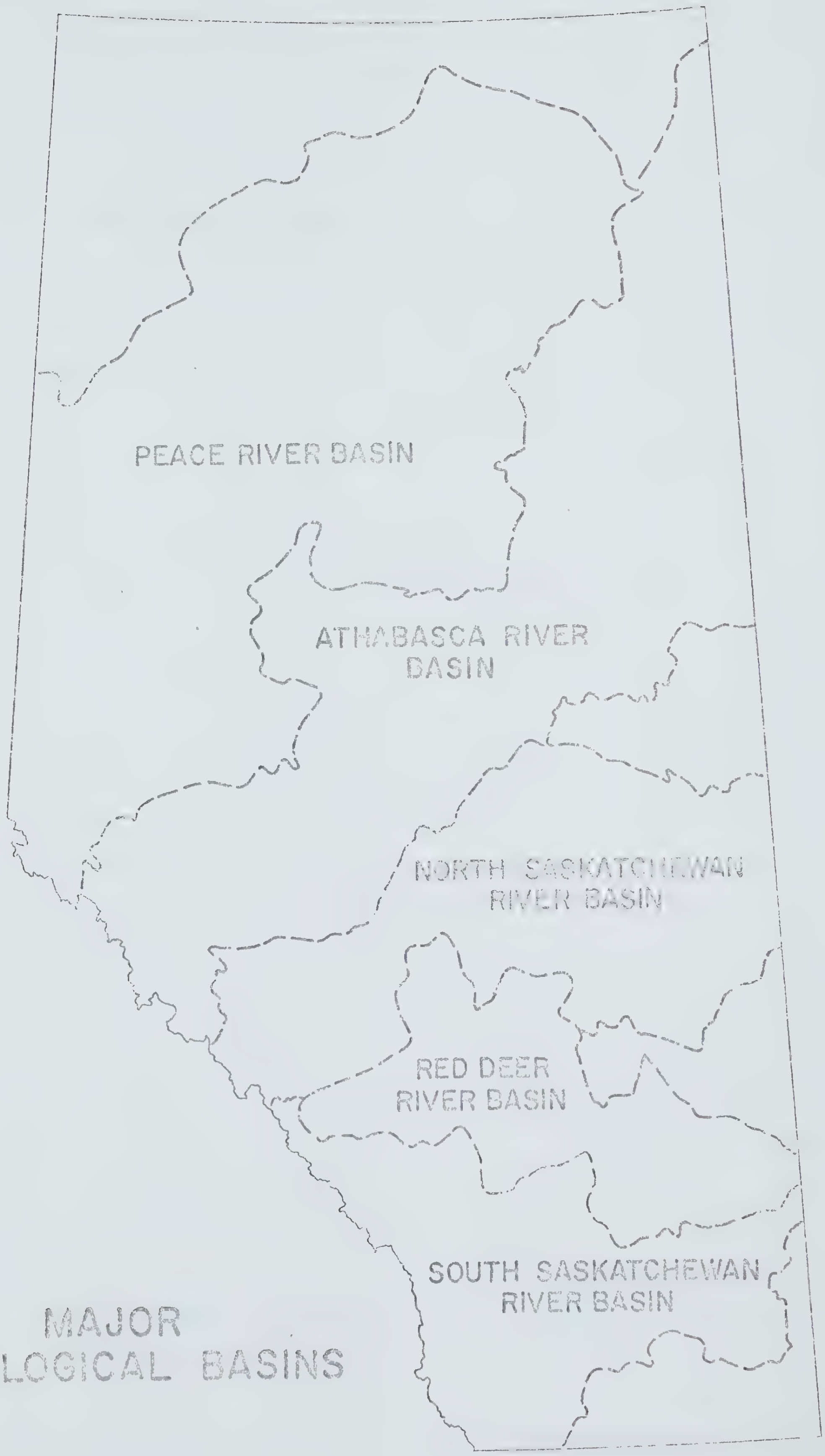
- Review of projects formulated at the regional level for compatibility with provincial programs.
- Identification of overlap or duplication of projects between regions for the Planning Advisory Board.
- Establishment of standards and techniques for project formulation of water resource projects.

3. Project Reconnaissance Section
   - Field inspection, air-photo interpretation and review of maps and literature for a geological assessment of assigned projects.
   - Carrying out ground control and mapping as required for project investigations.
   - Field investigation on assigned projects.
   - Establishment of survey standards and techniques.
4. Systems Analysis Section
   - Application of "systems design" techniques to various proposals formulated within the provincial or regional offices to permit the evaluation of these proposals.
   - Provision of computer programming and analysis service to the various sections within the Central Planning Group and to other Branches.
   - Application of computer techniques in design and analysis.
   - Establishment and maintenance of a program library, and development of systems for storing and retrieving data pertinent to the Central Planning Group's operation.
   - Compilation of annual fiscal estimates for expenditures.

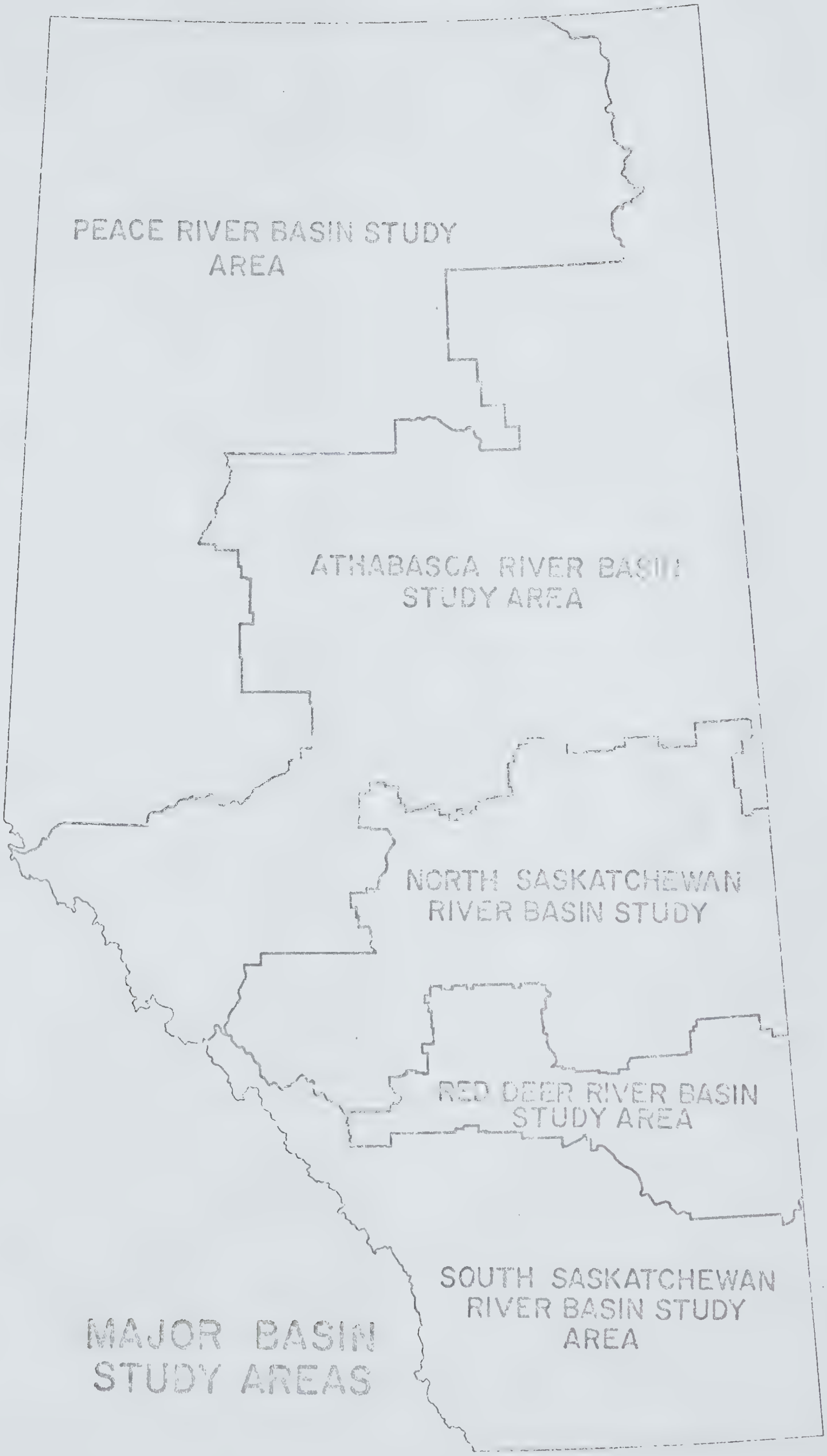
- Scheduling of projects and studies to be undertaken by the Division.

Basin Engineer Duties

- Identification of demands and problem relating to water resource development and management in a particular basin.
- Conducting river basin studies to evaluate the present demands for and future impact of water resource development on the social, economic and physical resources of the basin.
- Formulation and evaluation of alternative plans for water resource development which will ensure the needs of society in the river basin are satisfied.
- Co-ordination of river basin planning activities with municipalities, irrigation districts and planning commissions in the basin.


PEACE RIVER BASIN
ATHABASCA RIVER BASIN
NORTH SASKATCHEWAN RIVER BASIN
RED DEER RIVER BASIN
SOUTH SASKATCHEWAN RIVER BASIN

MAJOR HYDROLOGICAL BASINS


PEACE RIVER BASIN STUDY AREA
ATHABASCA RIVER BASIN STUDY AREA
NORTH SASKATCHEWAN RIVER BASIN STUDY
RED DEER RIVER BASIN STUDY AREA
SOUTH SASKATCHEWAN RIVER BASIN STUDY AREA

MAJOR BASIN STUDY AREAS

PLATE N

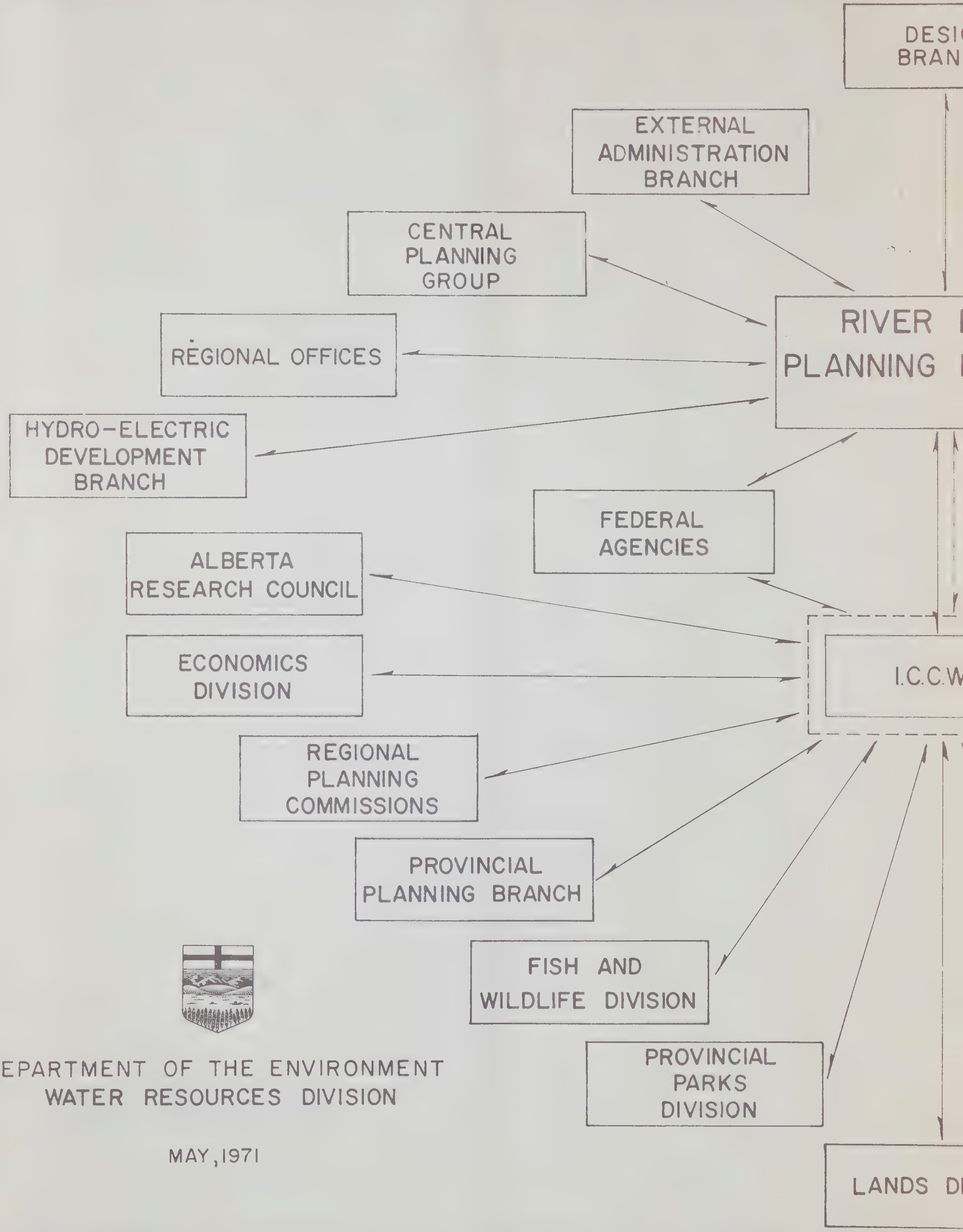
REQUEST AND PROJECT DEMANDS

River Basin Study Area	F + D	E	C + L	WS	I	R	S	O	Total
South Saskatchewan	196	37	5	17	14	3	0	5	277
Red Deer	390	28	5	6	4	5	3	4	445
North Saskatchewan	730	27	43	18	3	6	3	4	839
Sturgeon (sub-basin)	199	5	14	1	0	0	1	0	220
Battle (sub-basin)	154	6	14	5	2	3	4	3	191
Athabasca	452	24	36	18	0	4	0	2	536
Peace	305	21	12	17	3	1	3	0	362
Total	2,073	137	101	76	24	19	14	15	2,459

LEGEND

F + D - Flooding + Drainage	WS - Water Supply
E - Erosion	I - Irrigation
C + L - Lake + Water Control plus Water Level	R - Recreation
	S - Sewage

O - Pollution, Channel Improvement, Seepage, Diversion, Power, Conservation, Groundwater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CENTRAL PLANNING GROUP
RIVER
PLANNING
REGIONAL OFFICES
HYDRO-ELECTRIC DEVELOPMENT BRANCH
FEDERAL AGENCIES
ALBERTA RESEARCH COUNCIL
ECONOMICS DIVISION
I.C.C.W
REGIONAL PLANNING COMMISSIONS
PROVINCIAL PLANNING BRANCH
FISH AND WILDLIFE DIVISION
PROVINCIAL PARKS DIVISION
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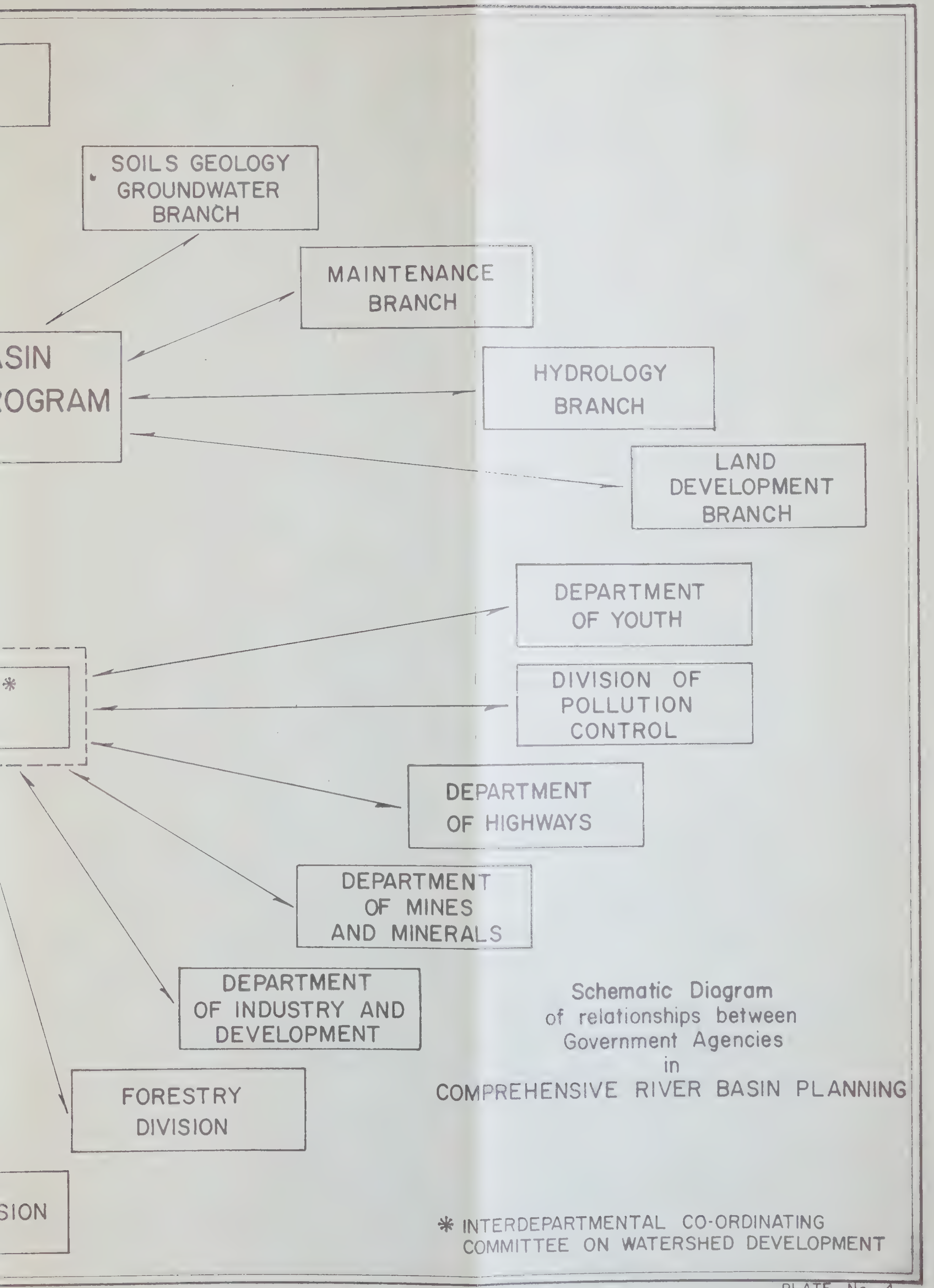
WATER RESOURCES DIVISION

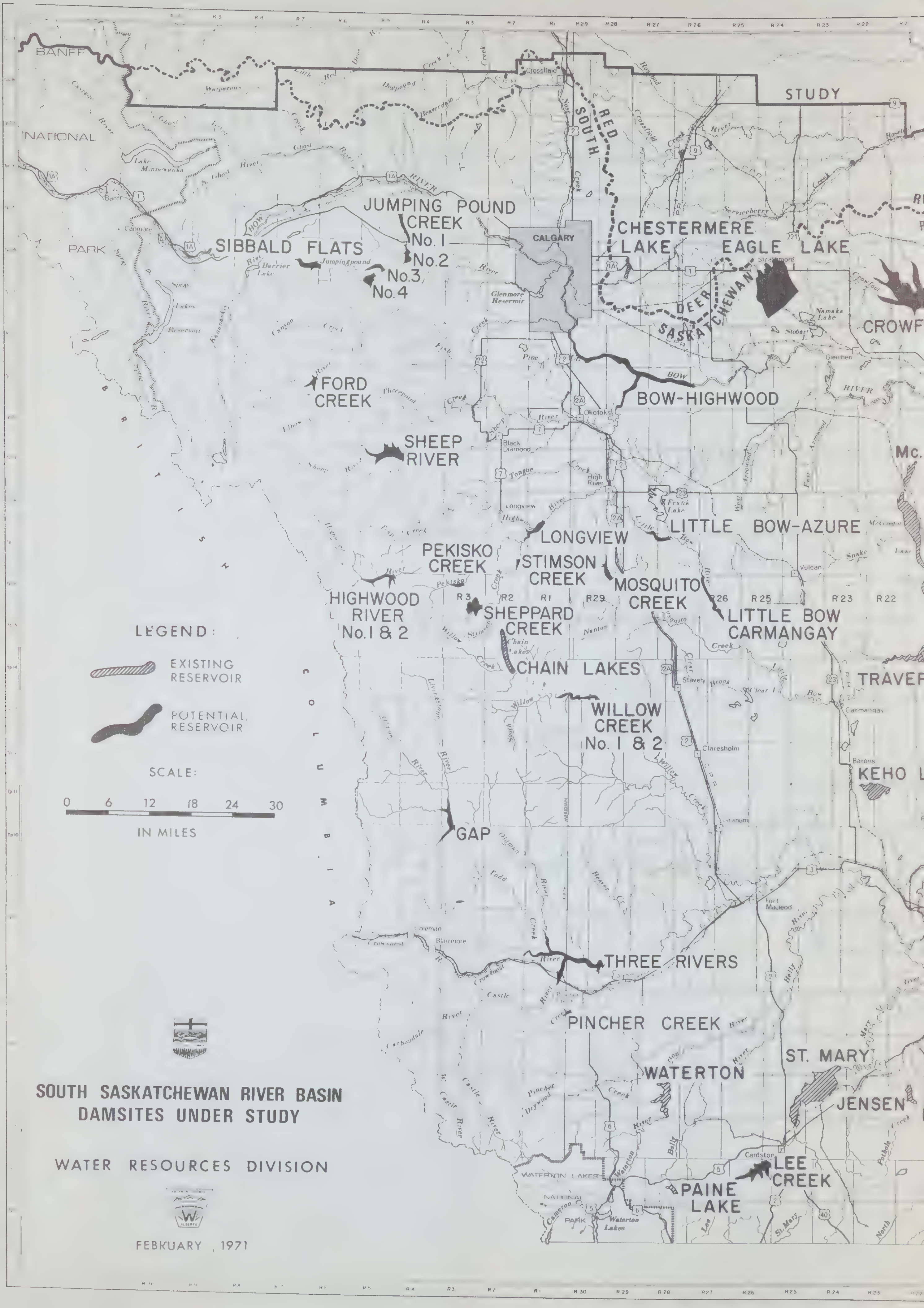
MAY, 1971


SOILS GEOLOGY GROUNDWATER BRANCH
MAINTENANCE BRANCH
ASIN
OGRAM
HYDROLOGY BRANCH
LAND DEVELOPMENT BRANCH
DEPARTMENT OF YOUTH
*
DIVISION OF POLLUTION CONTROL
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF MINES AND MINERALS
DEPARTMENT OF INDUSTRY AND DEVELOPMENT
FORESTRY DIVISION
SION

Schematic Diagram
of relationships between
Government Agencies
in
COMPREHENSIVE RIVER BASIN PLANNING

* INTERDEPARTMENTAL CO-ORDINATING
COMMITTEE ON WATERSHED DEVELOPMENT

PLATE No. 4



SOUTH SASKATCHEWAN RIVER BASIN
DAMSITES UNDER STUDY

WATER RESOURCES DIVISION

FEBRUARY, 1971

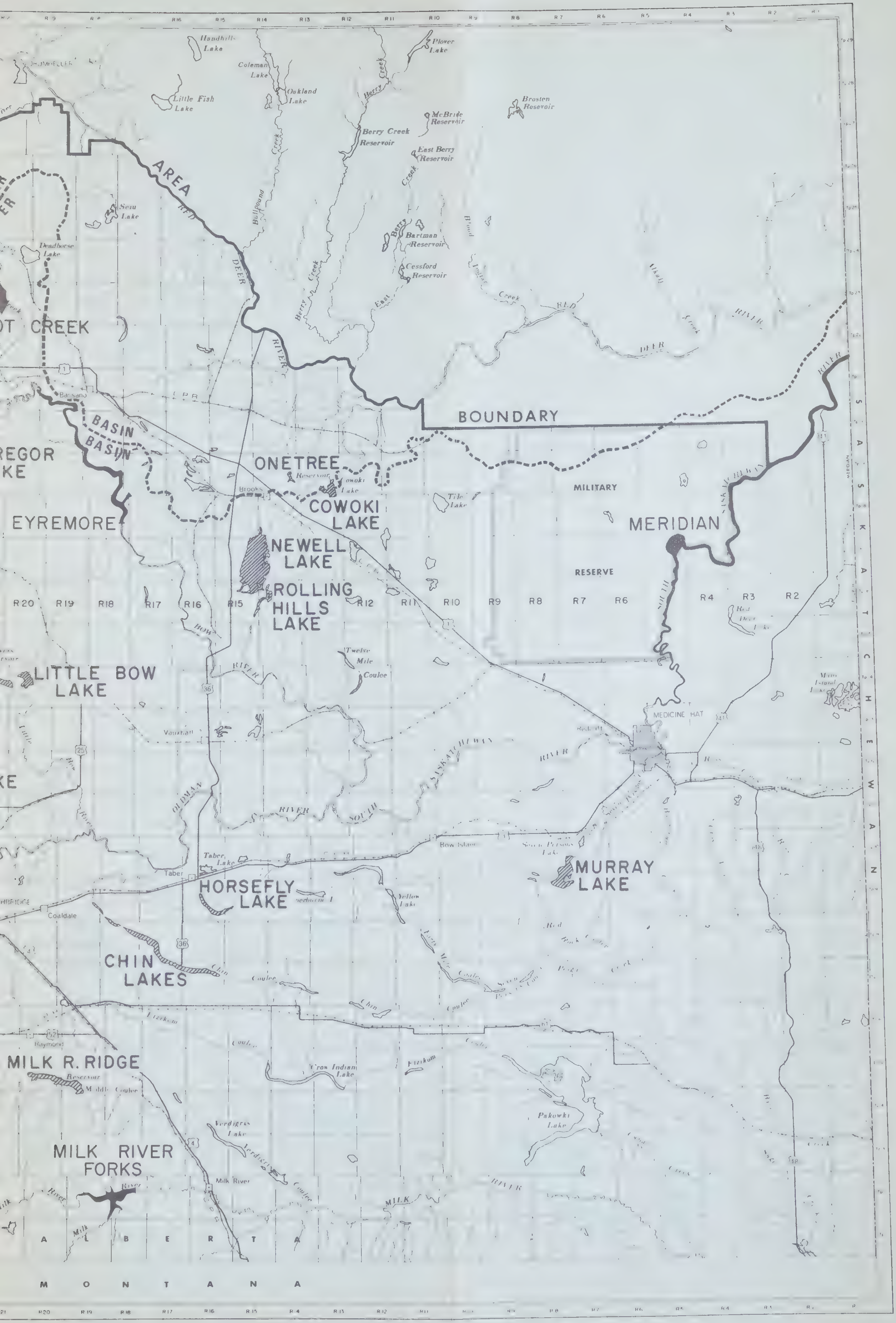

Handhills Lake
Coleman Lake
Plover Lake
Little Fish Lake
Oakland Lake
Berry Creek
Brosten Reservoir
McBride Reservoir
Berry Creek Reservoir
East Berry Reservoir
Creek
AREA
RED
Bullpound
Creek
Seiu Lake
Deadhorse Lake
Berry
Bartman Reservoir
Blood
Cessford Reservoir
DEER
Berry Creek
East
Indian
Creek
RED
Alkali
Creek
RIVER
OT CREEK
RIVER
DEER
RIVER
Bassano
C.P.R.
BOUNDARY
BASIN
BASIN
REGOR
KE
ONETREE
Reservoir
Cowoki Lake
Brooks
COWOKI LAKE
Tide Lake
MILITARY
SASKATCHEWAN
EYREMORE
MERIDIAN
NEWELL LAKE
RESERVE
ROLLING HILLS LAKE
SOUTH
R20
R19
R18
R17
R16
R15
R12
R11
R10
R9
R8
R7
R6
R4
R3
R2
Red Deer Lake
BOW
Twelve Mile Coulee
LITTLE BOW LAKE
RIVER
Many Island Lake
MEDICINE HAT
Vauxhall
SASKATCHEWAN
RIVER
OLDMAN
RIVER
SOUTH
KE
Bow Island
Seven Persons Lake
Taber Lake
Taber
MURRAY LAKE
HORSEFLY LAKE
Yellow Lake
BRIDGE
Coaldale
Red Rock Coulee
CHIN LAKES
Chin
Coulee
Forty Mile Coulee
Seven Persons Coulee
Chin
Coulee
Etzikom
Raymond
Coulee
Crow Indian Lake
Etzikom
MILK R. RIDGE
Reservoir
Middle Coulee
Pakowki Lake
Verdigris Lake
Verdigris Coulee
MILK RIVER FORKS
Milk River
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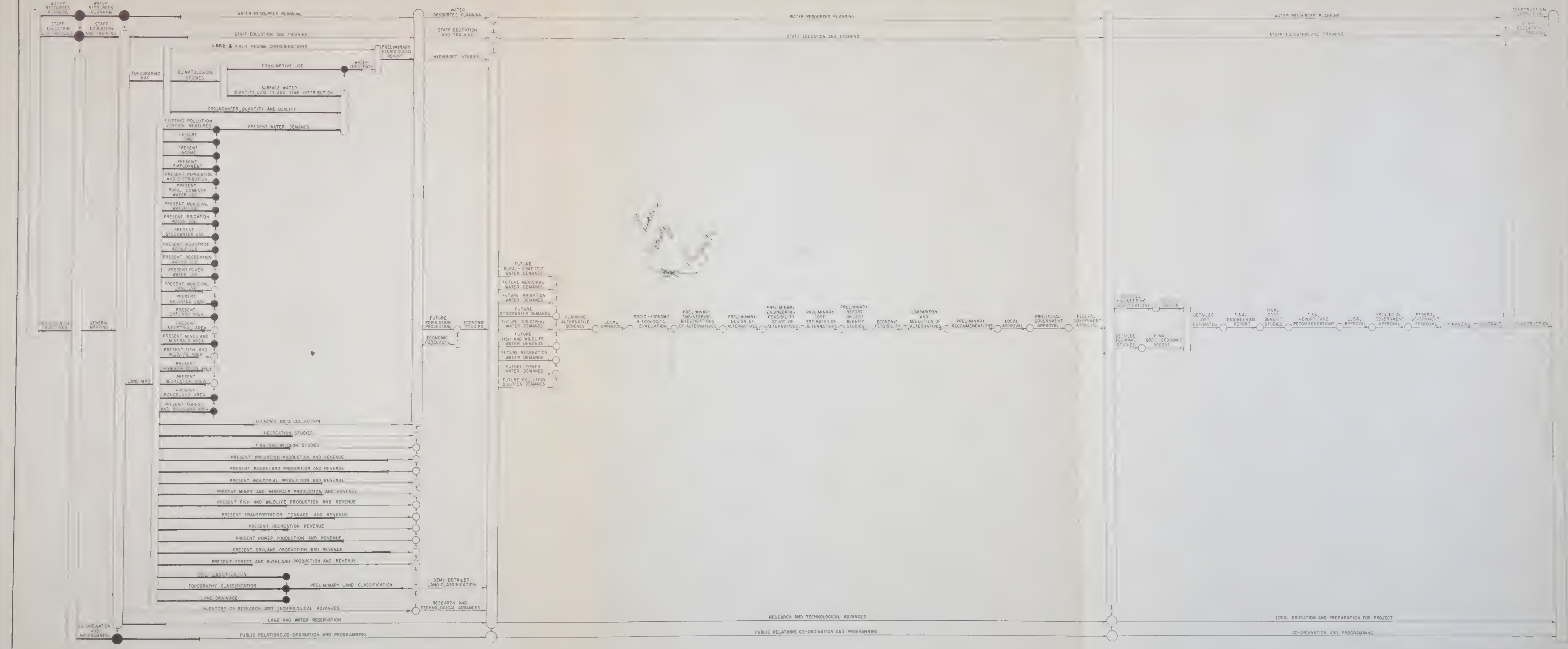
PLATE No. 5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LAKE & RIVER REGIME CONSIDERATIONS
PRELIMINARY HYDROLOGICAL REPORT
TOPOGRAPHIC MAP
CLIMATOLOGICAL STUDIES
CONSUMPTIVE USE
WATER EFFICIENCY
SURFACE WATER QUANTITY, QUALITY AND TIME DISTRIBUTION
GROUNDWATER, QUANTITY AND QUALITY
EXISTING POLLUTION CONTROL MEASURES
PRESENT WATER DEMANDS
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PRESENT EMPLOYMENT
PRESENT POPULATION AND DISTRIBUTION
PRESENT RURAL DOMESTIC WATER USE
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PRESENT IRRIGATION WATER USE
PRESENT STOCKWATER USE
PRESENT INDUSTRIAL WATER USE
PRESENT RECREATION WATER USE
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PRESENT INDUSTRIAL AREA
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PRESENT FISH AND WILDLIFE AREA
PRESENT TRANSPORTATION AREA
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OBJECTIVES
GENERAL MAPPING
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FUTURE IRRIGATION WATER DEMANDS
FUTURE STOCKWATER DEMANDS
FUTURE INDUSTRIAL WATER DEMANDS
FUTURE FISH AND WILDLIFE WATER DEMANDS
FUTURE RECREATION WATER DEMANDS
FUTURE POWER WATER DEMANDS
FUTURE POLLUTION DILUTION DEMANDS
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LOCAL APPROVAL
SOCIO-ECONOMIC & ECOLOGICAL EVALUATION
PRELIMINARY ENGINEERING INVESTIGATIONS OF ALTERNATIVES
PRELIMINARY DESIGN OF ALTERNATIVES
PRELIMINARY ENGINEERING FEASIBILITY STUDY OF ALTERNATIVES
PRELIMINARY COST ESTIMATES OF ALTERNATIVES
PRELIMINARY REPORT ON COST BENEFIT STUDIES
ECONOMIC FEASIBILITY
COMPARISON AND SELECTION OF ALTERNATIVES
PRELIMINARY RECOMMENDATIONS
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PROVINCIAL GOVERNMENT APPROVAL
FEDERAL GOVERNMENT APPROVAL
RESEARCH AND TECHNOLOGICAL ADVANCES
PUBLIC RELATIONS, CO-ORDINATION AND PROGRAMMING
ENGINEERING INVESTIGATIONS
DETAILED ECONOMIC STUDIES
FINAL SOCIO-ECONOMIC REPORT
DETAILED COST ESTIMATES
FINAL ENGINEERING REPORT
FINAL COST BENEFIT STUDIES
FINAL REPORT AND RECOMMENDATIONS
LOCAL APPROVAL
PROVINCIAL GOVERNMENT APPROVAL
FEDERAL GOVERNMENT APPROVAL
FINANCING
CONSTRUCTION
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STAFF EDUCATION TRAINING
LOCAL EDUCATION AND PREPARATION FOR PROJECT
CO-ORDINATION AND PROGRAMMING

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NETWORK DIAGRAM

SOUTH SASKATCHEWAN RIVER BASIN STUDY

SCALE N.T.S.
DATE MAY/71
SHEET
APPROVED BY
DATE
APPROVED BY
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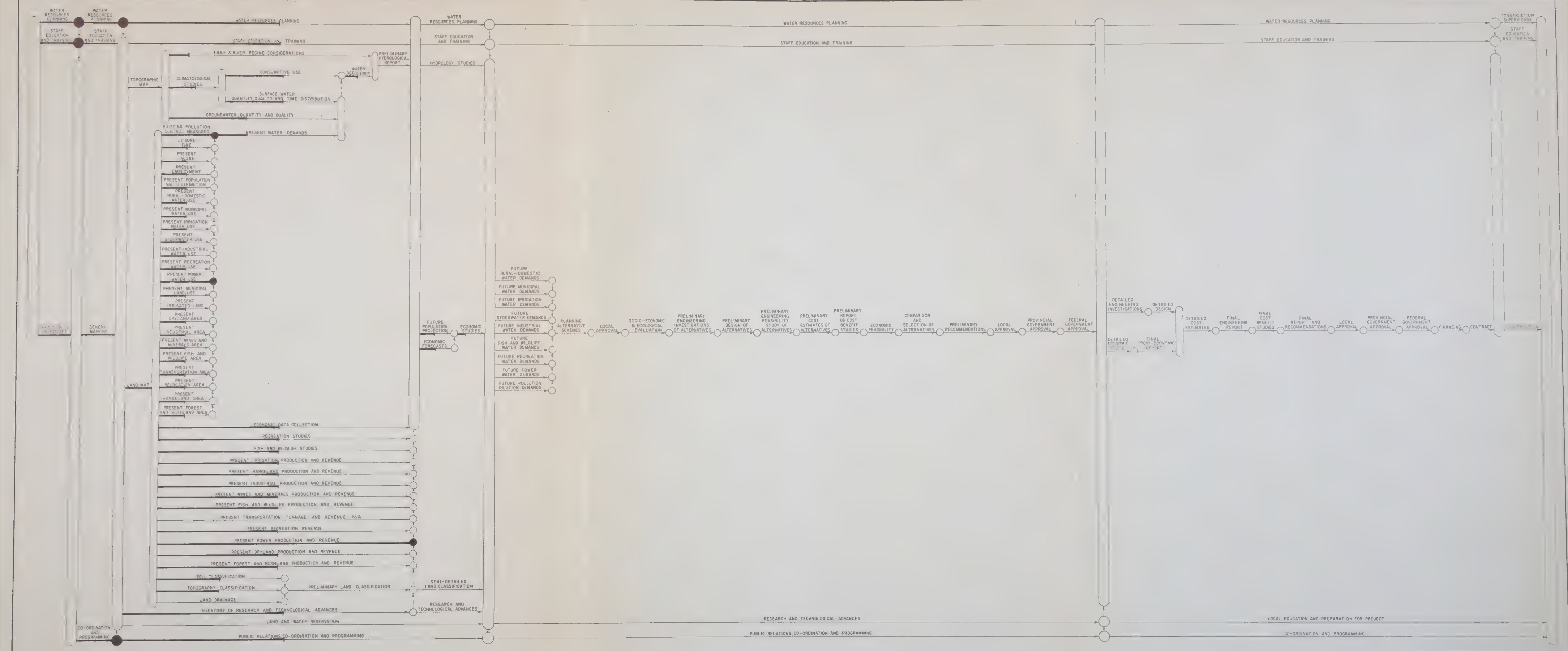
DESIGNED BY
DRAWN BY
SUBMITTED BY

PLATE No. 6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FUTURE RECREATION WATER DEMANDS
FUTURE POWER WATER DEMANDS
FUTURE POLLUTION DILUTION DEMANDS
PLANNING ALTERNATIVE SCHEMES
LOCAL APPROVAL
SOCIO-ECONOMIC & ECOLOGICAL EVALUATION
PRELIMINARY ENGINEERING INVESTIGATIONS OF ALTERNATIVES
PRELIMINARY DESIGN OF ALTERNATIVES
PRELIMINARY ENGINEERING FEASIBILITY STUDY OF ALTERNATIVES
PRELIMINARY COST ESTIMATES OF ALTERNATIVES
PRELIMINARY REPORT ON COST BENEFIT STUDIES
ECONOMIC FEASIBILITY
COMPARISON AND SELECTION OF ALTERNATIVES
PRELIMINARY RECOMMENDATIONS
LOCAL APPROVAL
PROVINCIAL GOVERNMENT APPROVAL
FEDERAL GOVERNMENT APPROVAL
RESEARCH AND TECHNOLOGICAL ADVANCES
PUBLIC RELATIONS, CO-ORDINATION AND PROGRAMMING
DETAILED ENGINEERING INVESTIGATIONS
DETAILED DESIGN
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DETAILED COST ESTIMATES
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PROVINCIAL GOVERNMENT APPROVAL
FEDERAL GOVERNMENT APPROVAL
FINANCING
CONTRACT
LOCAL EDUCATION AND PREPARATION FOR PROJECT
CO-ORDINATION AND PROGRAMMING

LEGEND

SYMBOL	NAME	DESCRIPTION
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○	NODE	START OR END OF ACTIVITY
- - ►	DUMMY	INDICATES ONLY DIRECTION OF FLOW

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DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES DIVISION

NETWORK DIAGRAM

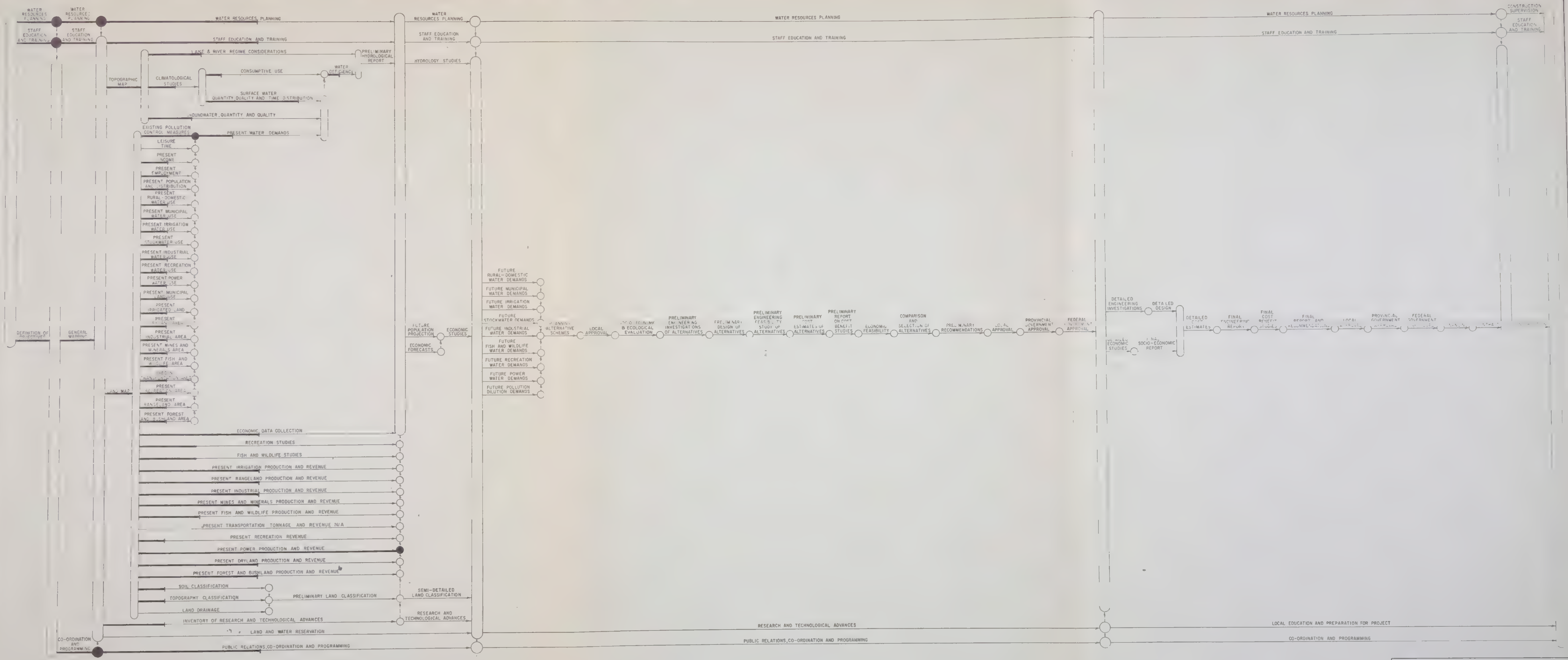
RED DEER RIVER BASIN STUDY

SCALE N.T.S. DATE MAY/71 SHEET

APPROVED BY
DATE
APPROVED BY
DATE

DESIGNED BY [illegible]
DRAWN BY SC
SUBMITTED BY ANDERSON

PLATE No. 7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STAFF EDUCATION AND TRAINING
WATER RESOURCES PLANNING
STAFF EDUCATION AND TRAINING
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GENERAL MAPPING
TOPOGRAPHIC MAP
LAND MAP
CO-ORDINATION AND PROGRAMMING
LAKE & RIVER REGIME CONSIDERATIONS
PRELIMINARY HYDROLOGICAL REPORT
CLIMATOLOGICAL STUDIES
CONSUMPTIVE USE
WATER DEFICIENCY
SURFACE WATER QUANTITY, QUALITY AND TIME DISTRIBUTION
GROUNDWATER, QUANTITY AND QUALITY
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PRESENT WATER DEMANDS
LEISURE TIME
PRESENT INCOME
PRESENT EMPLOYMENT
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PRESENT RECREATION REVENUE
PRESENT POWER PRODUCTION AND REVENUE
PRESENT DRYLAND PRODUCTION AND REVENUE
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TOPOGRAPHY CLASSIFICATION
LAND DRAINAGE
PRELIMINARY LAND CLASSIFICATION
SEMI-DETAILED LAND CLASSIFICATION
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RESEARCH AND TECHNOLOGICAL ADVANCES
LAND AND WATER RESERVATION
PUBLIC RELATIONS, CO-ORDINATION AND PROGRAMMING
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LOCAL EDUCATION AND PREPARATION FOR PROJECT
CO-ORDINATION AND PROGRAMMING
CONSTRUCTION SUPERVISION
STAFF EDUCATION AND TRAINING

LEGEND

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⟶	ARROW	ACTIVITY (JOB)
◯	NODE	START OR END OF ACTIVITY
⇠	DUMMY	INDICATES ONLY DIRECTION OF FLOW

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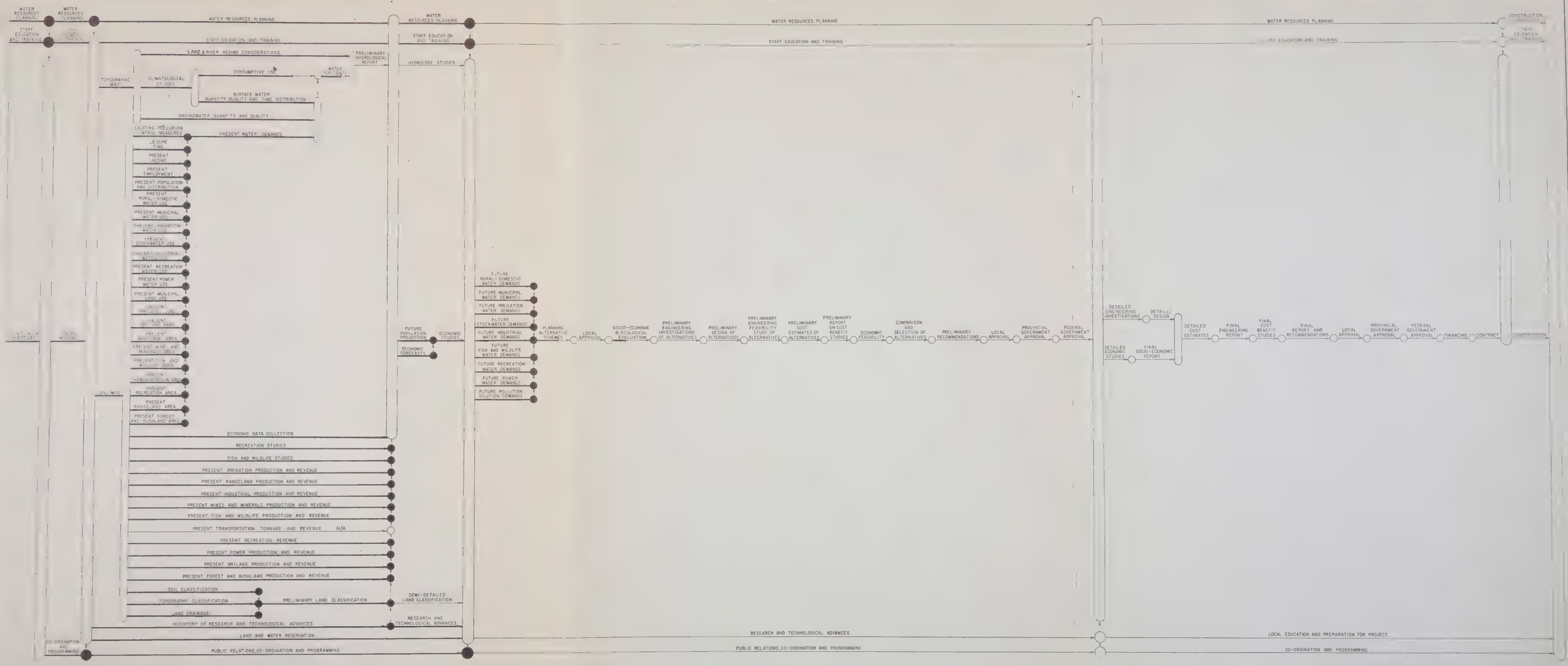
DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES DIVISION

NETWORK DIAGRAM

BATTLE RIVER BASIN STUDY

SCALE N.T.S.
DATE MAY/71
SHEET
APPROVED BY
DATE
APPROVED BY
DATE
DESIGNED BY [illegible]
DRAWN BY
CHECKED BY
PLATE No 9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LEGEND

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▯	NODE	START OR END OF ACTIVITY
- - - →	DUMMY	INDICATES ONLY DIRECTION OF FLOW

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DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES DIVISION

NETWORK DIAGRAM

STURGEON RIVER BASIN STUDY

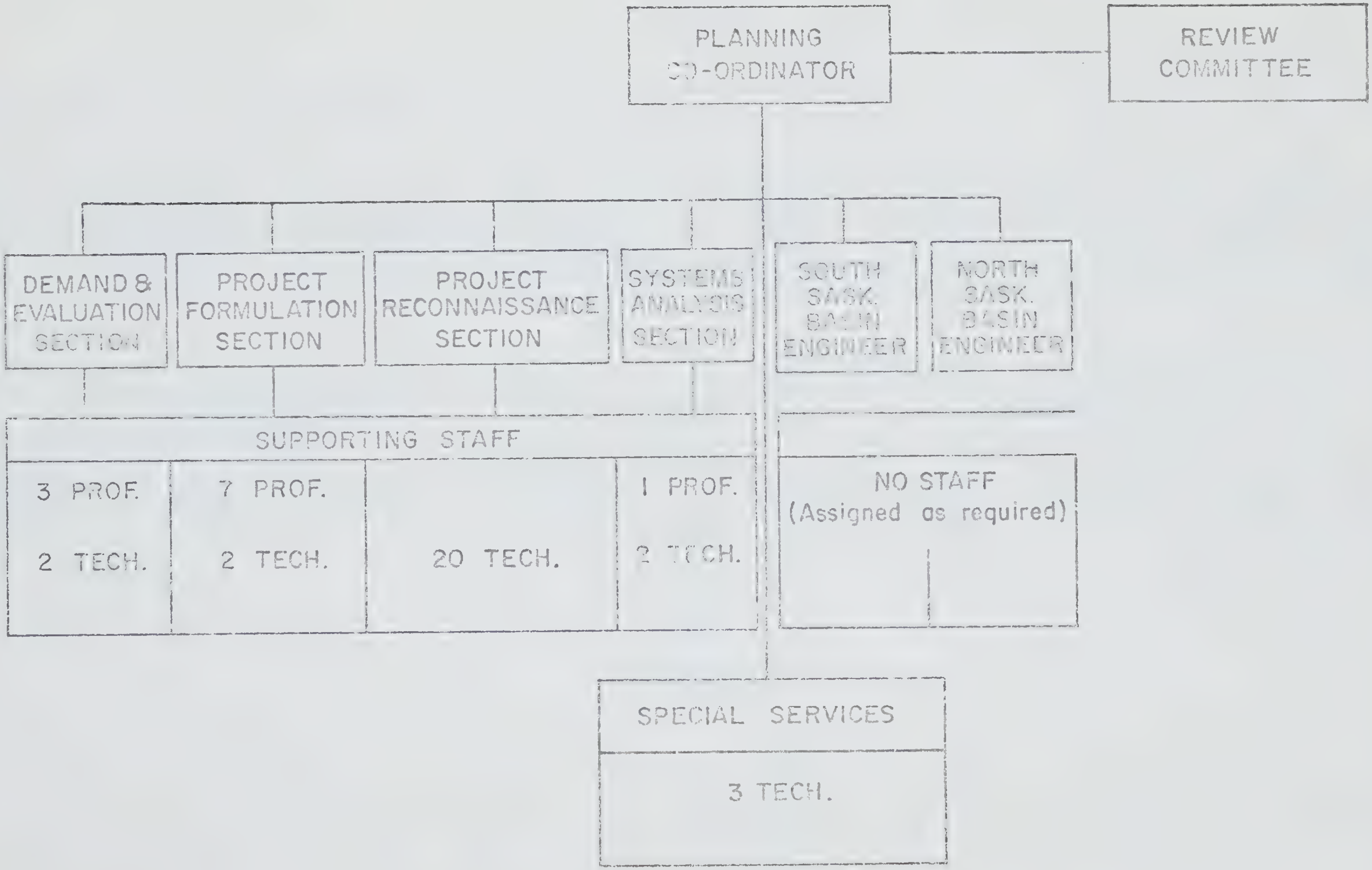
SCALE N.T.S. DATE MAY/71 SHEET

APPROVED BY ____
DATE ____
APPROVED BY ____
DATE ____

DESIGNED BY [illegible]
DRAWN BY [illegible]
SUBMITTED BY [illegible]

PLATE No 8

PRESENT ORGANIZATION CHART
CENTRAL PLANNING GROUP



IDEALISTIC ORGANIZATION CHART
CENTRAL PLANNING GROUP

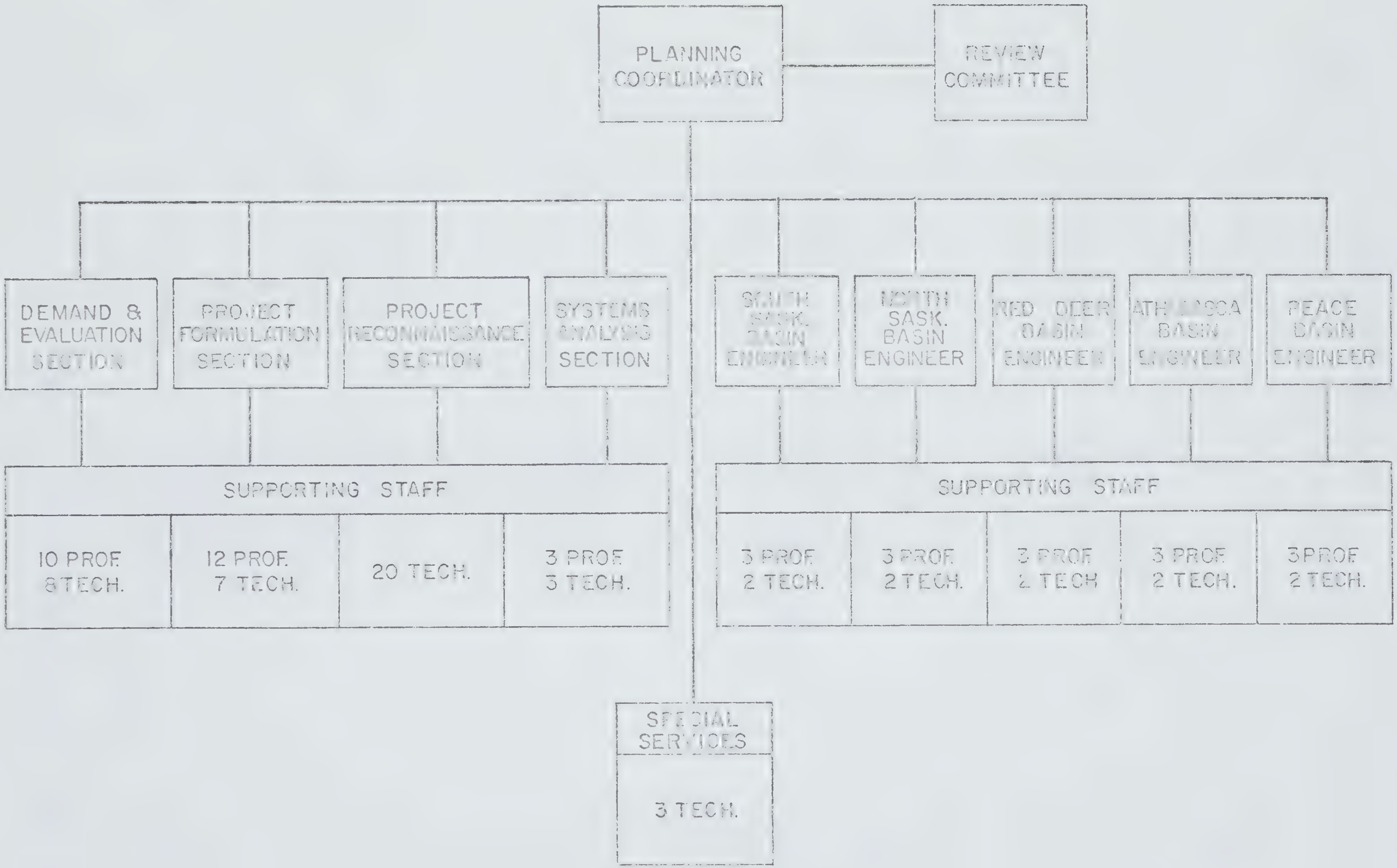


PLATE No. 11

CENTRAL PLANNING GROUP

PROJECT INVESTIGATIONS TO BE UNDERTAKEN 1971-72

Name of Project	Requested by	Purpose of Project	Estimated Cost
uth Sask. Basin			
Eagle Lake	Eastern Irrigation District	Water Supply - EID	$ 27,600
Lee Creek	Town of Cardston	Water Supply & Flood Control	$ 42,800
		Basin Total	$ 70,400
d Deer River Basin			
Raven Dam (Alt.)	City of Red Deer	Water Supply & Flood Control	$ 50,700
Raven-Bow (Alt.)			$ 27,400
Driedmeat Lake	Cities of Camrose & Wetaskiwin	Water Supply	$ 11,300
Berry Creek	Local Residents	Water Supply	$ 6,300
Bigelow Dam	Local Authorities	Water Conservation	$ 1,000
Gull Lake	Local Residents	Lake Level Stabilization	$ 3,300
		Basin Total	$100,000
abasca Basin			
Pembina Flood Control	Local Authority	Flood Control & Water Supply	$ 1,500
Paddle River	Local Authorities	Flood Control	$ 1,700
		Basin Total	$ 3,200
rth Sask. Basin			
Sturgeon Channel Improvement	County of Sturgeon	Flood Control & Water Supply	$ 13,500
Riviere Qui Barre	County of Sturgeon	Flood Control	$ 5,000
Isle Lake	Local Residents	Lake Level Stabilization	$ 10,000
Lac Ste. Anne	Local Residents	Lake Level Stabilization	$ 10,000
Wabamun Lake	C & U Committee	Lake Level Stabilization	$ 2,700
White Mud Creek	City of Edmonton	Flood Control & Recreation	$ 7,200
		Basin Total	$ 48,400
		Estimated Total Cost of Projects	$222,000

PLATE No. 12

CENTRAL PLANNING GROUP

SUMMARY OF ESTIMATED EXPENDITURE 1971-72

BASIN	PROJECTS	BASIN STUDIES	TOTAL
SOUTH SASK.	$ 70,400	$ 54,000	$ 124,400
RED DEER	96,700	21,000	117,700
ATHABASCA	3,200	20,000	23,200
NORTH SASK.	51,700	104,000	155,700
PEACE	-	4,000	4,000
TOTAL	$ 222,000	$ 203,000	$ 425,000

PLATE No. 13

NETWORK DIAGRAM FOR WATER RESOURCES PROJECTS

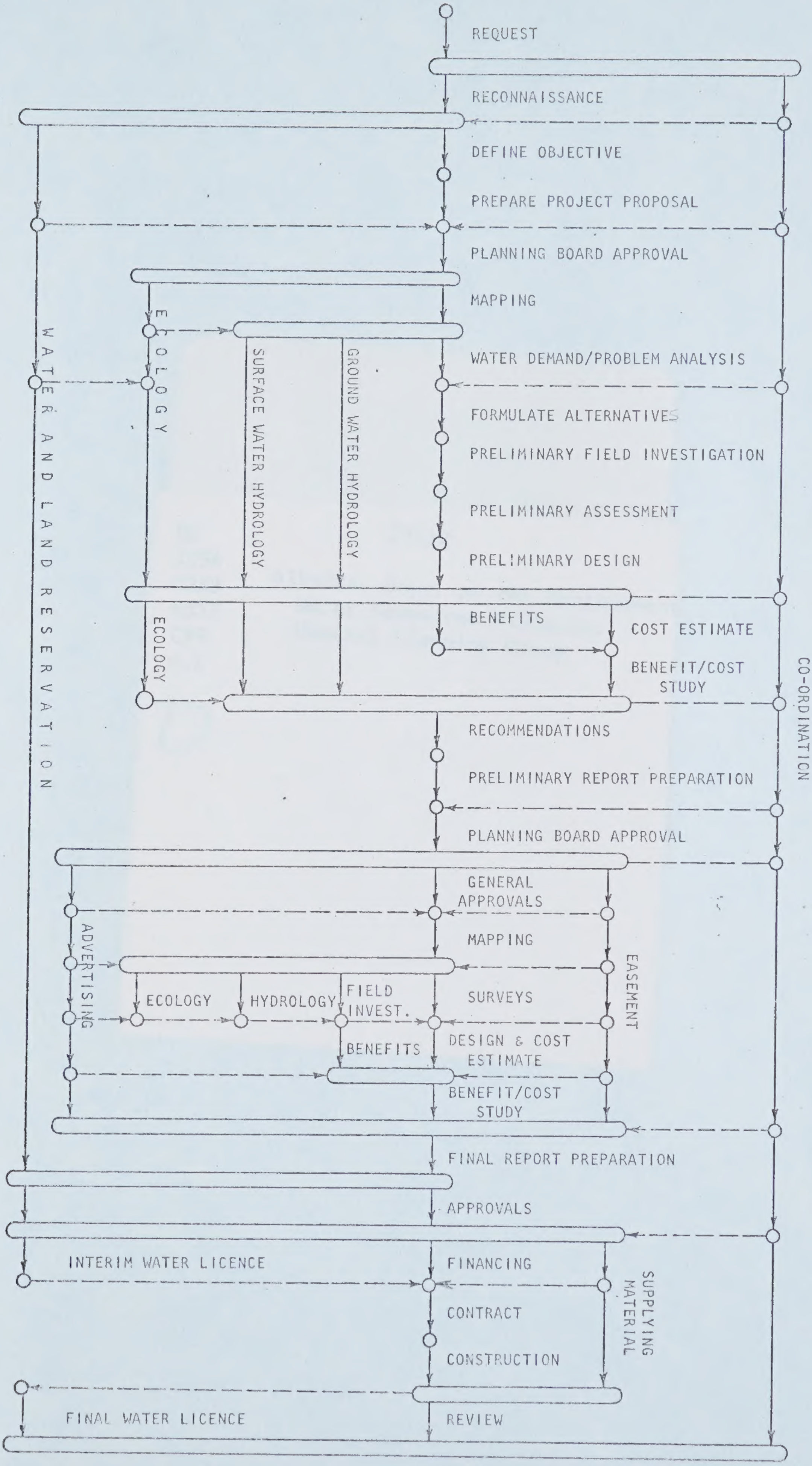


PLATE No. 14

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Alberta. Dept. of the Environment
Water Resources Division.
Central Planning Group

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